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Scleractinian Corals of Kuwait[1]

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ABSTRACT: A survey was made of the coral reefs of Kuwait to compile a species list of scleractinian corals. Twenty-eight hermatypic and six ahermatypic coral species are listed in systematic order, and a brief description is provided for each. A new species of *Acropora* is described. The Kuwait fauna is a small subset of the over 500 Indo-Pacific species. Several species show a higher degree of intraspecific variation than they exhibit in other locations. A range extension is reported for *Acanthastrea maxima* Sheppard & Salm, previously recorded from Oman (north and south coasts). A common species in the Arabian Gulf, *Porites compressa* Dana, has a disjunct distribution; it has not been found in the western Pacific, but occurs in the Red Sea, northern Indian Ocean, and Hawai'i. It is possible that the Gulf is one of the few places where *Siderastrea* and *Pseudosiderastrea* co-occur.

A SURVEY WAS MADE of the coral reefs of Kuwait for the Kuwait Institute of Scientific Research (KISR). K.C. conducted numerous coral reef and reef fish surveys between 1988 and August 1990, when the Gulf War interrupted work. K.C. escaped from occupied Kuwait; however, almost all KISR photographs and the coral reference collection, including type specimens and computer records pertaining to this study, were destroyed. Additional coral specimens were eventually obtained from Saudi Arabia in 1993, and finally in 1994 some new specimens were collected in Kuwait, and a few photographs were salvaged. G.H. made intensive coral reef surveys with K.C. in May 1990. The primary survey sites were the reefs associated with Qaru and Kubbar islands and three isolated reefs, Qit' at Urayfijan, Taylor's Rock, and Mudayrah (Figure 1). K.C. also surveyed soft-bottom habitats near pearl oyster beds located 1–4 km off the coast between Mina al Ahmadi and Ras J'Leya.

The need for a detailed taxonomy of Arabian Gulf (also known as the Persian Gulf) marine life has been increased by the environmental damage caused by the Gulf War (Fadlallah et al. 1992, Greenpeace 1992). The purpose of this paper is to provide a complete list of species found in Kuwait along with notes on taxonomic variation and geographical distribution. A more detailed treatment is planned for the future. In the interim, detailed taxonomic information for most species may be obtained by consulting standard taxonomic works such as the series on Scleractinia of eastern Australia by Veron, Pichon, Wallace and Best (1976–1984) and the revision of the suborders, families, and genera of the Scleractinia by Vaughan and Wells (1943).

Several coral taxonomists such as H. M. Bernard and J. S. Gardiner collected corals from or worked on corals collected from the Arabian Gulf in the early 1900s. They had the disadvantage of not being able to see the corals living underwater. More recent work

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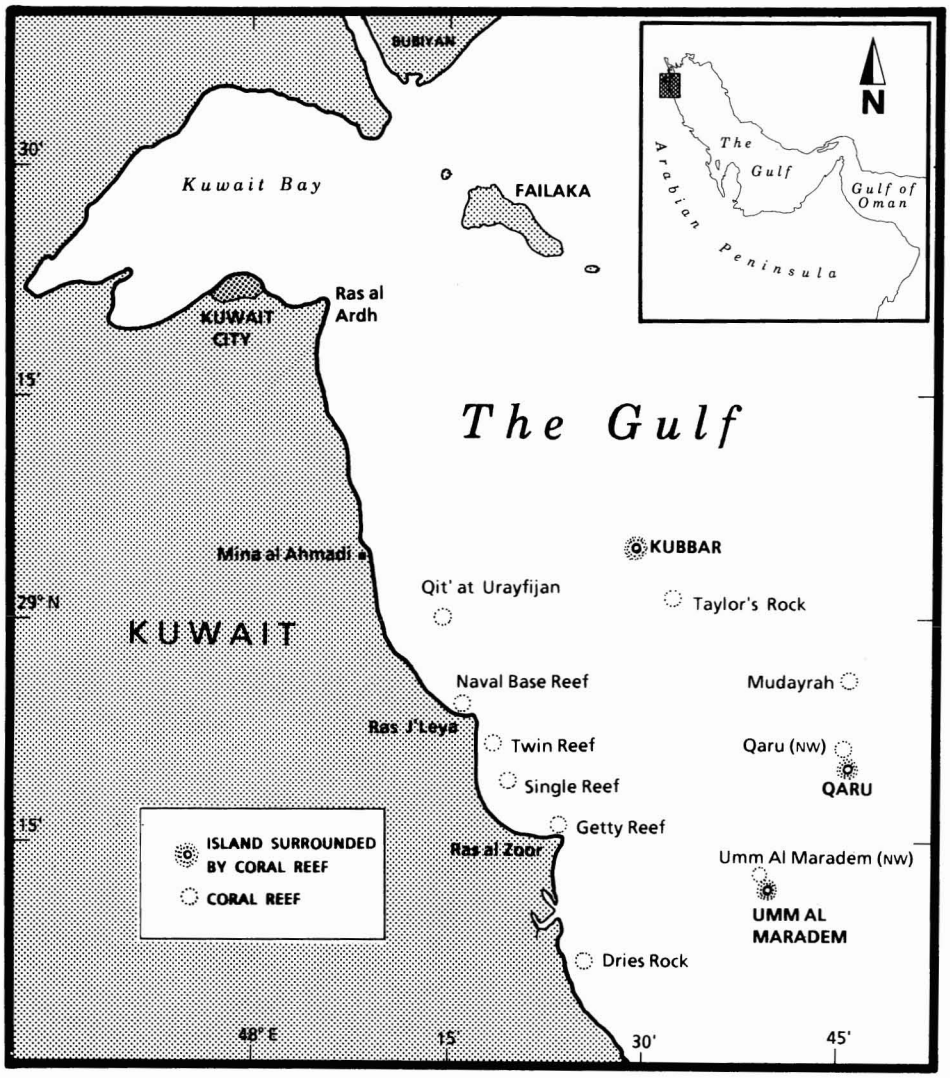

FIGURE 1. Coral reefs of Kuwait.

by Burchard (1979), Sheppard (1987), and Downing (1989), with the aid of scuba, has helped to bring the coral taxonomy of the region up to date.

Downing (1989) conducted extensive surveys of the coral reefs of Kuwait and distinguished 28 corals (25 reef-building), which he assigned to 21 genera. Of these, he definitively assigned species names to 17. In our study, we have identified 34 species, and differences between our findings and those of Downing are given in the taxonomic notes for each species.

Environmental Setting

The Arabian Gulf is a boot-shaped body of water ca. 1000 km long and <400 km wide at its widest point. Its southernmost point is located $<1°$ north of the tropic of Cancer. A

narrow passage, the Straits of Hormuz, connects the southern end of the Arabian Gulf with the Indian Ocean via the Gulf of Oman, allowing limited water exchange.

The physical conditions of the marine environment in the Gulf are near the limits of tolerance for most corals and have been described by McCain et al. (1984), Downing (1985, 1989), Coles (1988), IUCN (1988:163–165, 271–290), Coles and Tarr (1990), Coles and Fadlallah (1991), and Fadlallah et al. (1994). In Kuwait waters, temperatures in shallow water range between 11.5 and 33.4°C; Coles (1988) measured a high of 35.1°C at a reef in Tarut Bay, Saudi Arabia. Tides may exceed 4 m, and reef flat corals are exposed to subaerial temperatures ranging from near 0 to as high as 46°C with a relative humidity near 0%. Low rainfall and high evaporation make the seawater hypersaline; it usually ranges between 39 and 42 ppt, but can reach 70 ppt. Although the fetch in the Gulf is generally short, waves up to 2 m high are not uncommon during storms.

Some corals may be found growing on rocky outcrops close to shore. But most corals grow on patch reefs and reefs associated with several offshore islands. This distribution pattern appears to be primarily controlled by high rates of sedimentation near shore and availability of hard substrate.

A large amount of sediment is discharged into the northern end of the Gulf by the Tigris and Euphrates rivers. This sediment is distributed throughout the Gulf by high winds and strong currents generated during winter (November–February). Underwater visibility is often limited to 1 m or less, and at a depth of 1 m, turbidity may reach 0.7 NTU (Downing 1985).

In Kuwait waters, hard substrata located below a depth of 15 m are generally covered with a layer of silt. At Taylor's Rock, for example, below 15 m, the substratum is bedrock; despite a relatively steep slope of about 30°, the rock is devoid of reef-building corals and is covered with a layer of fine sediment about 5 cm deep. Living beneath the sediment, a few small ahermatypic corals can be found. Observations during all seasons suggest that the 15-m limit may be a result of a combination of lack of light from a high load of suspended sediment, apparently high sediment deposition rates, and a layer of sediment buildup below that depth (some reef-building corals do not settle on fine sediment [Hodgson 1990]).

Biogeography

In Kuwait, as in other environments near the limits of the physiological tolerance of corals, such as in Hawai'i and Hong Kong, species diversity is limited. With three exceptions, Kuwait's corals are a subgroup of the diverse western Pacific fauna. The first exception, *Anomastraea*, is found throughout the central and western Indian Ocean but has not been reported east of India. The second exception, *Acanthastrea maxima* Sheppard & Salm, was only described in 1988. The large size and distinctive characters of this species suggest that it has not been overlooked elsewhere but is in fact restricted to the Arabian Gulf, Gulf of Oman, and northwestern Arabian Sea. The third exception is the new species of *Acropora*, which is not found in the western Pacific.

For some groups, there is a high degree of genetically based polymorphism. In Kuwait, as in Hawai'i, this is manifested particularly in the one species of ramose *Porites*, of which there are over a dozen distinct forms ranging from thin branches to massive heads. *Favia pallida* (Dana) also shows a high degree of polymorphism. Other species show little tendency of polymorphism and appear identical to their western Pacific relatives.

In the Arabian Gulf, coral diversity increases with proximity to the Indian Ocean. Compared with the 28 reef-building corals we report here, Burchard (1979) and Sheppard (1987) reported a combined total of 38 reef-building scleractinians from Saudi Arabia and Bahrain including the genera *Montipora*, *Blastomussa*, and *Echinophyllia*, which are not found in Kuwait. Sheppard and Salm (1988) reported 53 species from the Gulf of Oman, on the Indian Ocean side of the Straits of Hormuz, and the final total may

reach higher than 60 species after taxonomic problems have been resolved.

The 34 scleractinian corals recorded in Kuwait are listed below.

1. *Stylophora pistillata* (Esper, 1797)
2. *Madracis kirbyi* Veron & Pichon, 1976
3. *Acropora clathrata* (Brook, 1891)
4. *Acropora arabensis* Hodgson & Carpenter, n. sp.
5. *Porites lutea* Edwards & Haime, 1860
6. *Porites compressa* Dana, 1846
7. *Goniopora lobata* Edwards & Haime, 1860
8. *Siderastrea savignyana* Milne-Edwards & Haime, 1850
9. *Anomastraea irregularis* Marenzeller, 1901
10. *Psammocora superficialis* Gardiner, 1898
11. *Psammocora contigua* (Esper, 1797)
12. *Coscinaraea columna* (Dana, 1846)
13. *Pavona explanulata* (Lamarck, 1816)
14. *Pavona decussata* (Dana, 1846)
15. *Culicia tenella* (Dana, 1846)
16. *Polycyathus marigondoni* Verheij & Best, 1987
17. *Paracyathus stokesi* Milne Edwards & Haime, 1848
18. *Acanthastrea echinata* (Dana, 1846)
19. *Acanthastrea maxima* Sheppard & Salm, 1988
20. *Hydnophora exesa* (Pallas, 1766)
21. *Favia pallida* (Dana, 1846)
22. *Favites pentagona* (Esper, 1794)
23. *Platygyra daedalea* (Ellis & Solander, 1786)
24. *Plesiastrea versipora* (Lamarck, 1816)
25. *Leptastrea transversa* Klunzinger, 1879
26. *Cyphastrea microphthalma* (Lamarck, 1816)
27. *Cyphastrea serailia* (Forskål, 1775)
28. *Heterocyathus aequicostatus* Edwards & Haime, 1848
29. *Turbinaria peltata* (Esper, 1794)
30. *Turbinaria reniformis* Bernard, 1896
31. *Heteropsammia cochlea* (Spengler, 1781)
32. *Dendrophyllia gracilis* Edwards & Haime, 1948
33. *Tubastraea coccinea* Lesson, 1829
34. *Tubastraea tagusensis* Wells, 1982

Brief descriptions of the growth forms, color, habitat, depth range, and geographic range of the species are given below. A complete description is provided for the new species of *Acropora*.

Family Pocilloporidae Gray

Genus *Stylophora* Schweigger

Stylophora pistillata (Esper, 1797)

TYPE LOCALITY: East Indian Ocean.

DESCRIPTION: Colonies generally <20 cm in diameter, composed of blunt dichotomous branches originating from a central base; branch thickness depends on the colony's exposure to water currents and wave action. Colony color is distinctive, tan to brown with lighter, yellowish, branch tips. White polyps are often extended during the day.

DISTRIBUTION: Widespread in the Indo-West Pacific, from East Africa to Pitcairn Island and from Kyushu to South Africa. In the Middle East, more common in Kuwait than in Saudi Arabia, but present around the Arabian Peninsula. Depth range in Kuwait 1–6 m; most abundant at 3 m on the reef flat at Mudayrah and at Qaru Island; absent at inshore reefs such as Qit' at Urayfijan.

Genus *Madracis* Edwards & Haime

Madracis kirbyi Veron & Pichon, 1976

TYPE LOCALITY: Palm Islands, Australia.

DESCRIPTION: Colonies with incrusting growth form reach 1 m diameter; sometimes carry nodular extensions that become subramose. All colonies so far observed in Kuwait are a uniform reddish brown.

DISTRIBUTION: Indo-West Pacific; reported from Oman, the Arabian Gulf, Thailand, Australia, Philippines, Taiwan. In Kuwait, this species is restricted to low-light areas, usually on vertical or subvertical walls below 10 m near the base of the reef. Scattered colonies observed on the southern edge of Qaru,

the southeastern edge of Kubbar reef, and around Mudayrah.

TAXONOMIC NOTES: Burchard (1979) reported this species from eastern Saudi Arabia.

Family ACROPORIDAE Verrill

Genus *Acropora* Oken

Acropora clathrata (Brook, 1891)

TYPE LOCALITY: Mauritius.

DESCRIPTION: Forms wide tables that may be single or multilayered generally <2 m in diameter and commonly <1 m in diameter. Growth form may become tabulo-corymbose when vertical branchlets are well developed, a tendency not recorded from other localities. In colonies consisting of multilayered tables and exhibiting a high degree of vertical branchlet formation, the branches do not anastomose as much as they do in colonies with branches in a single layer. In general, the degree of anastomosation in Kuwait is less than that recorded from other areas. However, when single-table colonies grow in areas exposed to wave action, the table may become almost completely solid as skeleton fills in the spaces between adjacent branches. Branches 1.0 to 1.5 cm diameter; vertical branchlets ca. 0.6 cm diameter. There are two common color morphs, light and dark brown, with the dark brown being more common. Polyps sometimes extended during the day.

Axial corallites 1.8 to 2.3 mm diameter, usually ca. 2.0 mm; opening about 1.0 to 1.1 mm diameter, exsert to 3.0 mm. A distinctive characteristic of this species is that the radial corallites on horizontal branches face directly upward (open vertically). Radial corallites ca. 1.4 mm diameter; opening 1.0 mm diameter. Radial corallite walls are shovel-shaped (uncinate), located on the distal (to the branch tip) side of the corallite, up to 3.0 mm in height. As in most *Acropora*, corallites on the underside of branches and near branching points are immersed and lack walls (lips). In some cases, the lips may flare, especially near the tips of vertically growing branchlets; often they become gutter-shaped, dimediate, and rarely tubular or nariform. Septal development appears dependent on the degree of exposure to currents and wave action.

Colonies from exposed habitats are more heavily calcified and show greater septal development. In that case both directives well developed, lamellar, often meeting in center; others are mere spines projecting toward the center. In less-exposed areas where coralla are poorly calcified, septa are poorly developed, usually less than one-half the corallite radius. In that case, the directive septa are usually obvious but other septa are either a thin ridge or short spines projecting from the inner wall. Corallites smoothly costate; coenosteum loosely reticulate. The fine skeletal structure of this species and the extensive development of corallite walls gives coralla a very rough appearance similar to *A. robusta*.

FIELD IDENTIFICATION: There are only two species of *Acropora* in Kuwait, and only *A. clathrata* forms a table; the other is a new species. Small colonies of the two species may be differentiated by the much rougher appearance of *A. clathrata* caused by frequent branching and obliquely exsert corallites compared with the relatively smooth surface of the new species (see next description) created by its appressed corallites.

DISTRIBUTION AND ECOLOGY: Widespread in the Indo-Central Pacific from Madagascar to the Tuamotus south to Dampier, western Australia. In the Middle East reported from the Red Sea, Kuwait, western Saudi Arabia, and Oman. In Kuwait, common in patches from 2 to 5 m depth on most reefs.

TAXONOMIC NOTES: *Acropora clathrata* has been reported from Musandam by Sheppard and Salm (1988). Sheppard (1987) did not specify any *Acropora* species from the Arabian Gulf. Photos in Burchard (1979) labeled species C and D (groups 4 through 9) are clearly *A. clathrata*. Downing (1989) tentatively identified this coral as *A. eurystoma* (Klunzinger). Both *A. clathrata* and *A.*

eurystoma share a similar growth form; however, the fine skeletal details separate the two species. A major difference is that *A. eurystoma* has corallites more than twice as large as those of *A. clathrata*. Compared with specimens from other regions, Kuwait specimens of *A. clathrata* show a greater degree of vertical branchlet formation.

Acropora arabensis Hodgson & Carpenter, n. sp.

TYPE LOCALITY: Kubbar Island, Kuwait.

DESCRIPTION: Colonies arborescent, sometimes caespitose, usually around 30 cm in diameter but may become larger and form extensive thickets (Figure 2). Branching pattern irregular (Figures 3 and 4). Branches ca. 1.0 to 1.5 cm in diameter near base and 10–20 cm long; in deeper, more protected water, branches are thinner (ca. 0.7 cm diameter) and more numerous, giving the colony a bushy appearance that superficially resembles *A. valida* (Dana). Axial corallites, 1.0 to 1.5 mm exsert, 2.3 to 2.8 mm diameter (usually ca. 2.6); opening 1.1 to 1.2 mm diameter. Radial corallites arranged in regular pattern (Figures 5 and 6), tending to form spiral series; corallites steadily decrease in size toward the branch tips; 3 cm from branch tip they are ca. 1.8 to 2.4 mm diameter; about 1 cm from branch tip, opening 0.8 to 1.1 mm diameter, usually 0.9 mm diameter. A few small, subimmersed corallites can be found between the rows of larger corallites. Radial corallites 4.0 to 7.0 mm exsert (usually ca. 5 mm), strongly appressed, dimediate to nariform, tending to flare as they approach branch tips. In colonies from deep, protected areas, radial corallites become more tubular and are mixed with immersed ones. Directive septa moderately well developed, reaching almost to center, lamellar with spines; other septa are simple rows of spines reaching to about one-half the calice radius. Corallites broken-costate, coenosteum reticulate (reticulum looser in colonies from deeper, protected areas).

FIGURE 2. Live *A. arabensis* (60 by 30 cm), Kubbar, depth 5 m.

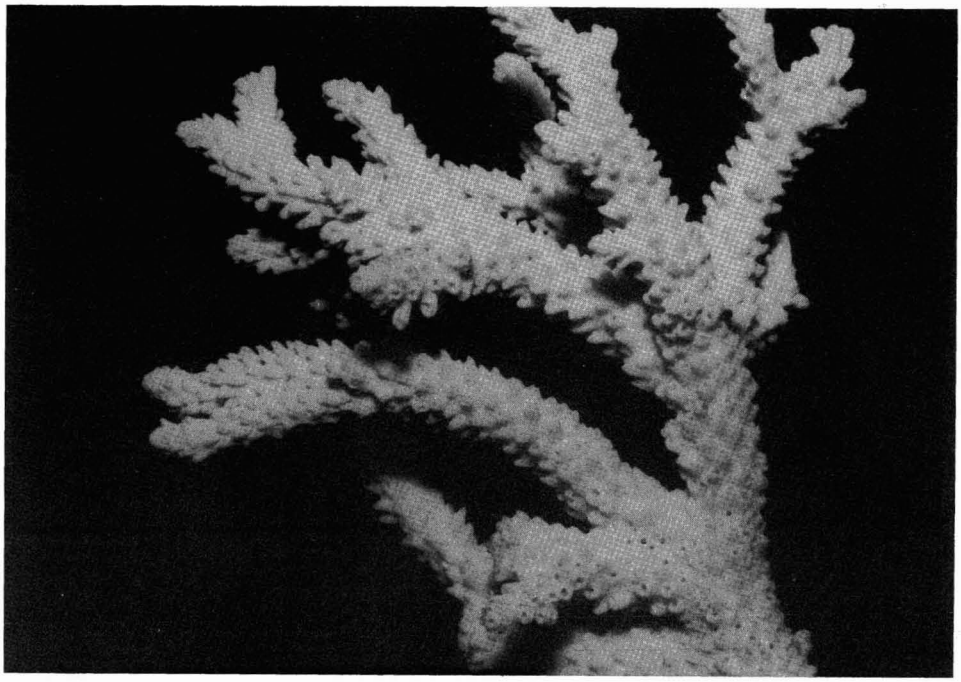

FIGURE 3. *A. arabensis* colony (× 1/3).

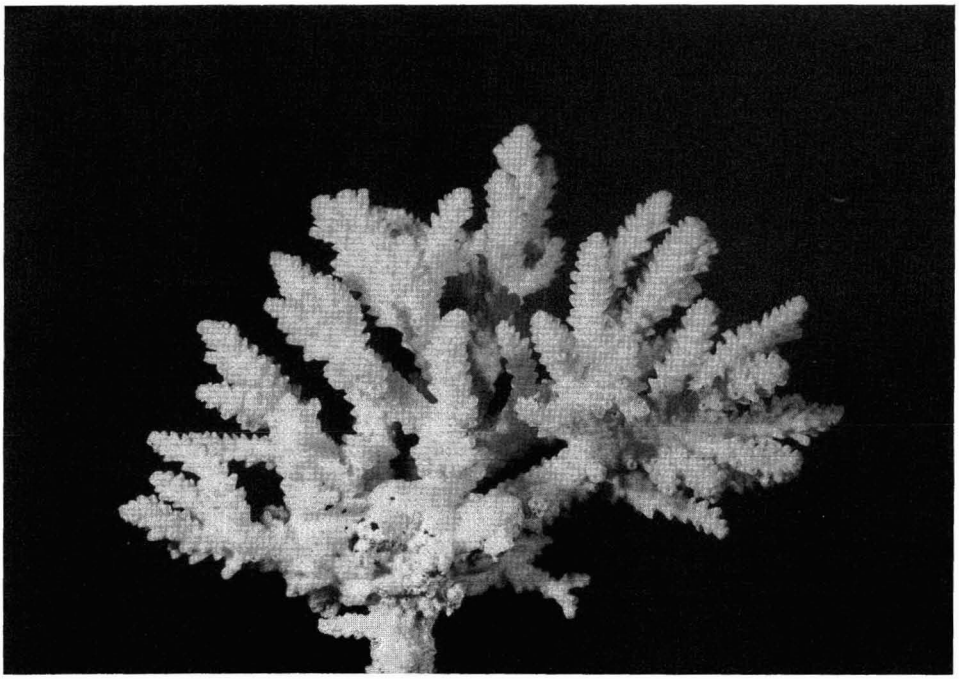

FIGURE 4. Holotype of *A. arabensis*, collected from 4 m depth, south side of Kubbar.

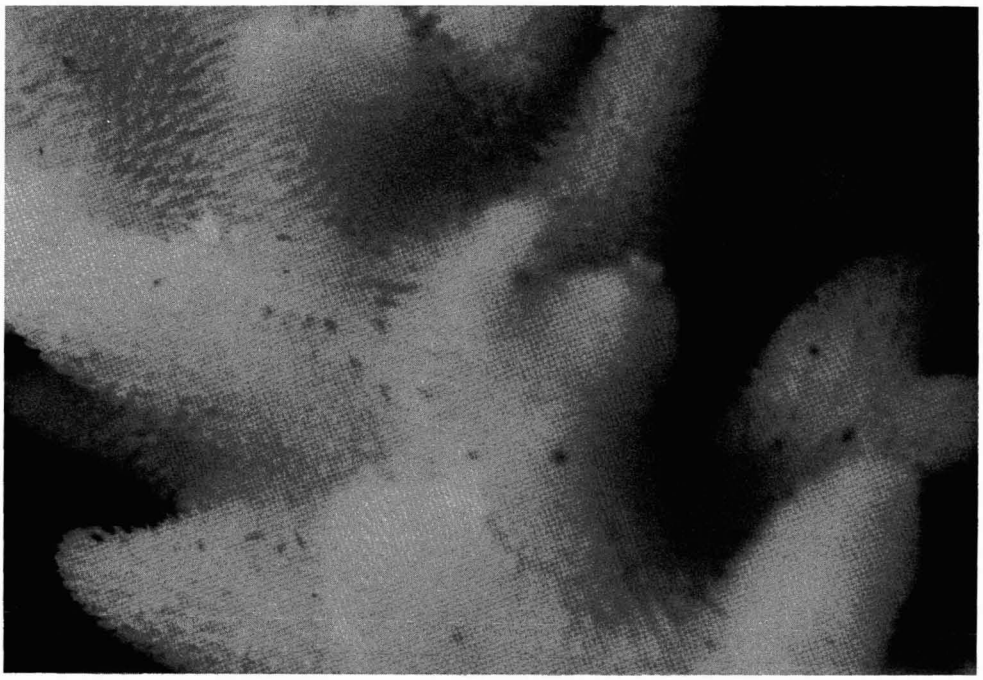

FIGURE 5. Radial corallites are often appressed (× 15).

FIGURE 6. Close-up (× 2) of live *A. arabensis* branch showing regular arrangement of radial corallites.

FIELD IDENTIFICATION: Light brown in color; the arborescent growth form and regular, ordered arrangement of strongly appressed corallites distinguishes this species from *A. clathrata*.

DISTRIBUTION: So far, known only from the Arabian Gulf. A ubiquitous species found mixed with *Acropora clathrata*; it is most common from 3 to 5 m.

TAXONOMIC NOTES: The photographs in Burchard (1979) labeled *Acropora* species A and B (groups 1, 2, 3, and 3a) are *A. arabensis*. There has been much uncertainty regarding *Acropora* species in the Gulf, and a definitive species list has not been available despite increased work in the area (Sheppard et al. 1992). Downing (1989) identified this species as *A. valida*. *Acropora arabensis* and *A. valida* are similar in that they both have strongly appressed and costate corallites and both have reticulated coenosteum. A primary difference between *A. valida* and *A. arabensis* is that the growth form of *A. valida* is corymbose or caespito-corymbose, whereas most colonies of *A. arabensis* are arborescent and some are caespitose but never corymbose. In addition, although the calice diameter of *A. arabensis* is almost double that of *A. valida*, the corallite size of *A. valida* is larger than that of *A. arabensis*. The corallites of *A. valida* are often tubular, whereas *A. arabensis* corallites are most often dimediate to nariform. *Acropora arabensis* also superficially resembles *A. microphthalma* (Verrill) in overall growth form, in the fact that colony bases are often dead, and in having nariform corallites. However, calice diameter of *A. arabensis* is double that of *A. microphthalma*, and the corallites of *A. arabensis* are strongly appressed and tend to recurve toward the branch, whereas in *A. microphthalma* these tend to curve away from the branch. In addition, the axial corallites of *A. arabensis* are larger than those of *A. microphthalma*.

TYPE MATERIAL: Holotype: 11 (Figure 4), Kuwait: south side of Kubbar Island (29° 04′ 51″ N, 48° 30′ 22″ E), at a depth of 5 m, 28 March 1994, K. Carpenter and A. Al Safar (of KISR). Paratypes (Kuwait): 12, 13, 14, same data as holotype; paratypes (Saudi Arabia): 1, 2, 4, 6, 10, Abu Ali Reef, at a depth of 2 m, June 1991, Ruben A. Estudillo (of the Research Institute of the University of Petroleum and Minerals, Dhahran, Saudi Arabia).

Kuwait specimens originally collected by the authors and stored at KISR were destroyed during the Gulf War. Abu Ali Reef is located ca. 10 km north of Al Jubayl, Saudi Arabia. The Saudi Arabia specimens are stored at the Marine Science Institute, University of the Philippines, Manila.

In comparison to the Kuwait specimens, the Saudi specimens show greater irregularity of growth form, and radial corallites are less regularly arranged, less appressed, and recurved.

Family PORITIDAE Gray

Genus *Porites* Link

Porites lutea Edwards & Haime, 1860

TYPE LOCALITY: Fiji.

DESCRIPTION: Corallum massive with smooth surface, often developing irregular humps of variable size and sometimes columniform lobes; may grow into large coral heads or "bommies" several meters in diameter. Color various shades of brown.

DISTRIBUTION: Widespread in the Indo-Central Pacific, Red Sea to the Tuamotus, south to Houtman Abrolhos, Australia. Common on all reefs in Kuwait from 1 to 15 m. The largest colonies are generally found at shallow to intermediate depths of 3 to 7 m.

Porites compressa Dana, 1846

TYPE LOCALITY: Hawai'i.

DESCRIPTION: Colonies show a wide diversity of growth forms including incrusting, massive, nodular, columnar, and ramose with finger-sized branches; the most characteristic feature of these growth forms is the lack of regularity in the formation of branches and nodules. Colonies are usually <1 m in diam-

eter and frequently separated by patches of dead coral. Color most commonly dark brown but may be any shade of brown to grayish brown with branch and nodule tips often white resulting from fish predation.

DISTRIBUTION: Because of the morphological variation of the species, identification is difficult, and the true distribution of *P. compressa* is unknown. In the Indian Ocean region, it has been recorded from Mozambique, the Red Sea, the Arabian Gulf (Saudi Arabia), and Southeast India; however, these records are uncertain. The only record from the Pacific, outside of Hawai'i, was determined by Veron and Hodgson (1989) to be *P. cylindrica* (Dana). Extensive taxonomic surveys from Guam to Australia have failed to reveal *P. compressa*. In Kuwait, it is common on all reefs from 1 to 10 m.

TAXONOMIC NOTES: Specimens of *P. compressa* from Kuwait and Saudi Arabia have been compared with Vaughan's paratypes of Hawaiian *P. compressa* in the Bishop Museum and they all appear to be one polymorphic species. In Kuwait, more than 14 morphotypes have been counted on the reef flat at Qaru Island. Vaughan (1907) distinguished 16 principal and four subordinate morphotypes in Hawai'i. It is remarkable that the appearance of the shallow *P. compressa*–dominated reef flat at Qaru Island is indistinguishable from similar reef areas in Kāne'ohe Bay, Hawai'i. This high degree of intraspecific polymorphism appears to be a common feature of low-diversity reefs such as those found in Hawai'i and the Arabian Gulf, and is not common in high-diversity reefs such as those in the Philippines and Australia. Both Burchard (1979) and Sheppard (1987) reported three species of *Porites* from the Arabian Gulf; in addition to the two reported here, the species are *P. nodifera* Klunzinger by Sheppard and 'Form C' by Burchard. Based on examination of photographs, we believe the latter appears to be the massive morph of *P. compressa*.

Although the variation shown by *P. compressa* exceeds that of most other species, we have no evidence to suggest that these forms represent more than one species. We have not been able to examine specimens designated as *P. compressa* from other localities in the Indian Ocean or the Red Sea, and therefore we cannot judge whether they are the same species as Kuwait specimens. It is surprising that a species that is so abundant in the Gulf and Hawai'i is not found in the western Pacific. A study using the tools of molecular biology would help to resolve the biogeographic puzzle presented by the distribution of *P. compressa*.

Genus *Goniopora* De Blainville

Goniopora lobata Edwards & Haime, 1860

TYPE LOCALITY: Red Sea.

DESCRIPTION: Corallum columnar, 3.0 to 15.0 cm diameter (usually ca. 10 cm diameter); usually only the top of the column is living and the base is dead, so adjacent columns are attached by dead skeleton. Groups of columns separated by dead bases occur together in clumps and because the polyps are so long and fleshy, the clumps appear to form one large massive colony. Polyps are always extended, brown, with blue or pink lips, long, extending up to 10 cm.

DISTRIBUTION: Widespread in the Indo-West Pacific from East Africa and the Red Sea to Samoa and south to Shark Bay, Australia. Previously reported from the Gulf of Oman (Sheppard 1987). In Kuwait, usually found at the reef base between 10 and 15 m depth. Extensive patches may occur in protected lagoonal environments (e.g., between patch reefs at Mudayrah).

TAXONOMIC NOTES: Burchard (1979) recorded two forms (A and B) of *Goniopora*; both appear to be *G. lobata* based on examination of his photographs (plates 29, 30, and 31) and description.

Family SIDERASTREIDAE Vaughan & Wells

Genus *Siderastrea* De Blainville

Siderastrea savignyana Milne-Edwards & Haime, 1850

TYPE LOCALITY: Red Sea.

DESCRIPTION: Corallum closely incrusting to massive, usually 10 to 15 cm in diameter, but may reach 40 cm; colony surface smooth with slight indentations, becoming nodular when incrusting a rough surface or when infested by organisms such as barnacles. Colonies appear white with brown calices.

DISTRIBUTION: Indian Ocean, from South Africa to Sri Lanka, including the Red Sea and the Arabian Gulf. Present on most reefs in Kuwait, sometimes in clusters of several colonies; however, it is never abundant, generally found from 8 to 15 m, but occasionally as shallow as 3 m.

TAXONOMIC NOTES: Yabe and Sugiyama (1935) described the new genus and species *Pseudosiderastrea tayamai*, which Veron (1986) distinguishes from *Siderastrea* based on two characteristics: a double wall is present in *Siderastrea* and absent in *Pseudosiderastrea*, and septal fans are found in *Pseudosi derastrea* and lacking in *Siderastrea*. With the exception of the report by Sheppard and Salm (1988) that these two species coexist in Oman, the worldwide distributions of *Siderastrea savignyana* and *Pseudosiderastrea tayamai* are disjunct and bordering.

Because *Siderastrea* is more common in Kuwait than in other areas, we were able to examine dozens of specimens. The inner margins of septa in corallites of many colonies of *Siderastrea* are fused, creating the septal fans reported to distinguish *Pseudosiderastrea*. Two colonies collected from a shallow, sandy habitat looked identical to other *Siderastrea* colonies when alive. But after cleaning, the skeletons were revealed to be heavily calcified with thickened septa; the corallites lacked an inner synapticular wall and therefore by Veron's definition should be classified as *Pseudosiderastrea*. However, close inspection of corallites near the growing edge revealed the occasional presence of a double wall, although it tended to be obscured by the well-developed septa. Both *Siderastrea* and *Pseudosiderastrea* reproduce by extratentacular budding.

Because the characters of one or more of the genetically different morphs of *Siderastrea* overlap with those of *Pseudosiderastrea*, it may be that the two forms are in fact one species that shows substantial variation across its wide geographic range, with *Pseudosiderastrea* being the Indian Ocean morph and *Siderastrea* the western Pacific morph. The two forms apparently co-occur in only a few locations in the Indian Ocean (Veron 1993).

Genus *Anomastraea* Von Marenzeller

Anomastraea irregularis Marenzeller, 1901

TYPE LOCALITY: East Africa.

DESCRIPTION: Corallum massive, tending to form thick columns, the base up to 50 cm in diameter with columns extending up to about 50 cm in height. Overall colony color brownish; close examination reveals brown calices separated by thin white walls.

DISTRIBUTION: Western Indian Ocean including the Maldives, the Red Sea, Oman, and the Arabian Gulf. Found on most reefs of Kuwait at all depths but large colonies are most common at the base of reefs.

TAXONOMIC NOTES: In their revision of the scleractinia, Vaughan and Wells (1943) differentiated the genera *Anomastraea* from *Pseudosiderastrea* based on the mode of budding, with *Anomastraea* being intratentacular and *Pseudosiderastrea* extratentacular. All specimens of *Anomastraea* we examined from Kuwait exhibit both intra- and extratentacular budding, making this a poor character to distinguish these species (also see "Taxonomic Notes" for *Siderastrea*, which reproduces by extratentacular budding).

Genus *Psammocora* Dana

Psammocora superficialis Gardiner, 1898

TYPE LOCALITY: Marshall Islands.

DESCRIPTION: Has a wide variety of growth forms from thin incrustations a few centimeters in diameter to massive, irregularly shaped, hillocky colonies up to ca. 0.5 m in diameter and ca. 0.5 m in height. Colony color usually a uniform chocolate brown but some colonies dull green or gray; polyps not extended during the day.

DISTRIBUTION: Widespread in the Indo-West Pacific from East Africa to Samoa and the Ryukyus south to Houtman Abrolhos, Australia. In the Middle East, reported from the Red Sea, the Gulf of Aden, Arabian Gulf (Saudi Arabia), Musandam, and the Gulf of Oman. In Kuwait, found on most reefs, from 3 to 15 m depth; large, isolated colonies more common at the base of the reef.

TAXONOMIC NOTES: Previous uncertain records from the Arabian Gulf (Burchard 1979, Sheppard 1987, Sheppard and Salm 1988, Downing 1989) appear to be *P. superficialis.*

Psammocora contigua (Esper, 1797)

TYPE LOCALITY: Unrecorded.

DESCRIPTION: Colonies encrusting to ramose, often with fused, knoblike branches; typically <15 cm in diameter but may cover up to 1 m^2. The growth form with leaflike branches common in the western Pacific in protected habitats is present but not common in Kuwait. Colors range from fluorescent green to gray and various shades of brown; colonies often infested with iridescent blue barnacles; slender, tapering tentacles are sometimes extended during the day, giving the colony a fuzzy appearance.

DISTRIBUTION: Widespread in the Indo-West Pacific, from East Africa to Samoa and Kuwait to southwestern Australia. In the Middle East, reported from the Red Sea, the Arabian Gulf, and the Gulf of Oman. In Kuwait, found on most reefs from the intertidal zone to the reef base; most common at intermediate depths of 3 to 10 m.

TAXONOMIC NOTES: Downing (1989) listed this as *Psammocora planipora*, which is a junior synonym of *P. contigua.*

Genus *Coscinaraea* Edwards & Haime

Coscinaraea columna (Dana, 1846)

TYPE LOCALITY: Fiji.

DESCRIPTION: Corallum incrusting, explanate or massive, generally ca. 30 to 50 cm in diameter. In shallow water, colonies have brown calices, thick white intervening walls, and well-developed ridges; in deep water the entire colony is brown with a smooth surface.

DISTRIBUTION: Widespread in the Indo-Pacific from Madagascar to the Tuamotus and south to Houtman Abrolhos, Australia. From the Middle East, reported from Oman. Common on most reefs in Kuwait from the reef flat to reef base.

TAXONOMIC NOTES: Another species of *Coscinaraea, C. monile* (Forskål, 1775), characterized by highly developed and irregularly rounded collines, is very similar to the shallow-water forms of *C. columna* in Kuwait. However, most Kuwait specimens fall within the range of *C. columna* variation. *Coscinaraea columna* has relatively shallow corallites surrounded by subacute to rounded collines compared with the very rounded collines and deep calices of *C. monile.*

Family AGARICIIDAE Gray

Genus *Pavona* Lamarck

Pavona explanulata (Lamarck, 1816)

TYPE LOCALITY: Unknown.

DESCRIPTION: Colony unifacial, explanate, incrusting, submassive to columnar, up to ca. 1 m across. In deep water or in low-light conditions, colonies often form explanate plates as thin as 2.0 mm and centrally attached; in shallow water, plates are up to 10.0 mm thick. All colonies observed in Kuwait have a characteristic light tan color.

DISTRIBUTION: Widely distributed in the Indo-Pacific: Madagascar, Cocos Keeling, Great Barrier Reef, Philippines, Red Sea. Previously recorded from Kuwait and Oman. In Kuwait, this species is most common between 10 and 15 m depth and may dominate several square meters.

TAXONOMIC NOTES: The Kuwaiti variant of this species shows substantial skeletal variation from *P. explanulata* in the western Pacific. The calicular structure of Kuwaiti *P. explanulata* is similar to that of *Pavona minuta* Wells; however, *P. minuta* is not reported to form large explanate colonies. *P. explanu-*

lata colonies from Kuwait are more heavily calcified, have larger corallites, more exsert primary septa-costae, and have a greater tendency to form large, massive colonies than *P. explanulata* from the western Pacific.

Pavona decussata (Dana, 1846)

TYPE LOCALITY: Fiji.

DESCRIPTION: Colonies incrusting, up to 1 m but commonly ca. 20 cm in diameter; most colonies show strong but irregular development of collines with some incrusting to submassive colonies developing short (up to 5 cm), irregular branches that may anastomose. In other colonies, these branches develop into thin, bifacial folia, 0.4 to 0.7 cm thick, similar to those of *Pavona cactus* Forskål but shorter (up to 7 cm in length). Colony color dark brown with off-white collines and branch tips.

DISTRIBUTION: Widespread in the Indo-West Pacific, from the Red Sea to Samoa and south to Houtman Abrolhos, Australia. Not previously recorded from the Arabian Gulf; however, it is likely that this species commonly has been misidentified as *P. varians* Verrill. Common in Kuwait on most reefs, from the reef flat to the base of the reef.

TAXONOMIC NOTES: Burchard (1979) recorded *Pavona varians* and *P. praetorta* Dana from eastern Saudi Arabia; however, examination of photographs (plate 21 and plate 22) of those records suggests that they are *P. decussata*. Although this common species was not reported by Sheppard and Salm (1988), it is likely that their records of the closely related *Pavona venosa* Ehrenberg and/or *P. cactus* may be *P. decussata*.

Family RHIZANGIIDAE D' Orbigny

Genus *Culicia* Dana

Culicia tenella (Dana, 1846)

TYPE LOCALITY: Sydney, Australia.

DESCRIPTION: Reptoid colonies composed of clusters of dozens of corallites connected at their bases; occasionally, adjacent cylinders are fused along their sides. Color transparent brown, often with a bright orange ring about halfway between the mouth and the wall.

DISTRIBUTION: The genus needs revision, and therefore it is difficult to give an accurate distribution for any particular species. The distribution of the genus is widespread in the Indo-Pacific south to New Zealand. In Kuwait, *C. tenella* is found on all reefs, usually growing on the underside of rocks.

TAXONOMIC NOTES: Burchard (1979, plate 74) reported this species from eastern Saudi Arabia as *Culicia* sp.; subsequently, Burchard identified this coral as *C. tenella* (S. Coles, pers. comm.).

Genus *Polycyathus* Duncan

Polycyathus marigondoni Verheij & Best, 1987

TYPE LOCALITY: Mactan Island, Cebu, Philippines.

DESCRIPTION: Colony incrusting, reptoid, plocoid, composed of about two dozen corallites. Corallites round to oval, up to 2.5 mm in height, smallest 2.3 mm diameter, largest 5.0 mm diameter.

DISTRIBUTION: So far only reported from the Philippines. In Kuwait, common in low-light areas.

TAXONOMIC NOTES: This species shows little geographic variation. We concur with the suggestion of Verheij and Best (1987) to move *Polycyathus* and *Paracyathus* from the family Caryophylliidae to the family Rhizangiidae based on morphology.

Genus *Paracyathus* Edwards & Haime

Paracyathus stokesi Milne Edwards & Haime, 1848

TYPE LOCALITY: Unknown.

DESCRIPTION: Coralla solitary, height up to 16.0 mm from an incrusting basal plate. Corallite stalk cylindrical in immature individuals, tapering proximally (turbinate) in mature individuals, up to 8.7 mm at round

base, and 10.0 by 17.0 mm at top of ovoid corallite; viewed from above, corallite is almost oval, pinched across the short axis. Viewed from the side, the corallite walls are higher in the middle (the short axis) than at the ends of the long axis. Calice black (unless subjected to strong bleach), transparent polyp extended only at night.

DISTRIBUTION: Indian Ocean, Australia, western Pacific. In most regions, *P. stokesi* is found only in low-light areas, but in Kuwait, it is found both in the open and under rocks, most common below 10 m depth. Very abundant at Qit' at, particularly on the inner (steel) walls of a shipwreck.

Family MUSSIDAE Ortmann

Genus *Acanthastrea* Edwards & Haime

Acanthastrea echinata (Dana, 1846)

TYPE LOCALITY: Fiji.

DESCRIPTION: Colonies are incrusting to massive, irregularly rounded, reaching ca. 75 cm diameter. Colony color variable, usually mottled shades of green and brown. Large, fleshy polyps not extended during the day; when contracted, tend to form distinctive concentric circular folds of tissue.

DISTRIBUTION: Widespread in the Indo-Central Pacific from the Red Sea to the Tuamotus and south to Houtman Abrolhos. Previously recorded from the Arabian Gulf and Oman. Present on most reefs of Kuwait although usually not abundant; found throughout the depth range of reef-building corals but may tend to be more abundant in intermediate to deep water.

TAXONOMIC NOTES: Specimens from Kuwait closely resemble those from the western Pacific with the exception that the cerioid, thin-walled, *Favites*-like form has not been observed in Kuwait.

Acanthastrea maxima Sheppard and Salm, 1988

TYPE LOCALITY: Oman.

DESCRIPTION: Colonies are incrusting or form small, round heads. The largest colony so far observed in Kuwait was ca. 25 cm in diameter. Polyps not extended during the day. Colony color greenish to orange or red-brown; the retracted polyps tend to balloon out over the septa, which can be seen through the tissue, creating fleshy, white, radiating ridges. As in *A. echinata*, concentric folds of tissue surround the deeply inset corallites.

DISTRIBUTION: Previously only reported from the Gulf of Oman and southern Oman. In Kuwait, isolated colonies have been observed at Mudayrah, Taylor's Rock, and Kubbar Island at depths of 5 to 10 m.

TAXONOMIC NOTES: In contrast to the description of Sheppard and Salm (1988), the corallite diameter range of this species overlaps with that of *Acanthaster hillae* Wells, an apparently closely related species that has not been recorded from the Arabian Gulf.

In addition, Sheppard and Salm (1988) stated that *A. maxima* polyps may be extended during the day; however, they never reported observing tentacles. Our observations during the day and night indicate that this species puffs up its polyps slightly during the day. Colonies observed at night exhibited large, fleshy polyps and 3-cm-long tentacles similar to those of other mussids.

S. Coles (pers. comm.) suggests that records of *Acanthastrea* sp. and *Symphyllia* sp. by Burchard (1979) may refer to *A. maxima*.

Family MERULINIDAE Verrill

Genus *Hydnophora* Fischer De Waldheim

Hydnophora exesa (Pallas, 1766)

TYPE LOCALITY: Indian Ocean.

DESCRIPTION: Description is based on a single specimen, the first record from Kuwait. Colony is loosely incrusting, and has one thick branch. Colony size 15 by 20 cm, color green; rows of tentacles about 7 mm long, fully extended during the day, give the colony a shaggy appearance.

DISTRIBUTION: Widespread in the Indo-West Pacific from the Red Sea to Tuvalu south to Lord Howe Island. Not previously reported from Kuwait but reported from eastern Saudi Arabia and Oman. The specimen was collected from a gentle slope at a depth of 12 m on the south side of Qaru Island.

TAXONOMIC NOTES: The expanded tentacles of this specimen when alive were identical to those illustrated by Veron for the recently named species *H. pilosa* (Veron, 1985). In fact, the primary distinction between these two species is the long rows of extended tentacles of the latter. However, subsequent work in the Philippines (Veron and Hodgson 1989) revealed that the tentacles of *H. exesa* are also extended during the day, casting doubt on the validity of *H. pilosa*. If future work determines that *H. pilosa* is a distinct species, then the Kuwait specimen should be referred to *H. pilosa*.

Family FAVIIDAE Gregory

Genus *Favia* Oken

Favia pallida (Dana, 1846)

TYPE LOCALITY: Fiji.

DESCRIPTION: Colonies massive, rounded, usually up to ca. 20 cm diameter but may reach 40 cm. Both coloration and corallite arrangement are highly variable within a given habitat and even within one colony. Color may be various shades of uniform brown, gray, white or mottled green, or gray with brown patches.

DISTRIBUTION: Widespread in the Indo-Pacific, East Africa, the Red Sea to the Tuamotus, south to Houtman Abrolhos, Australia. Also reported from Oman and eastern Saudi Arabia. In Kuwait, found at all depths, but most common at ca. 3 to 5 m on reef flats.

TAXONOMIC NOTES: As Veron et al. (1977) pointed out, the plocoid form of *Favia pallida* can be confused with *F. favus* Forskål, and the cerioid form of *F. pallida*, which has irregularly exsert septo-costae, is similar to *F. matthaii* Vaughan. However, in Kuwait, a continuous series can be found between these extreme forms both between colonies in the same habitat and within a single colony.

Genus *Favites* Link

Favites pentagona (Esper, 1794)

TYPE LOCALITY: East Indies.

DESCRIPTION: Colonies are incrusting to submassive, sometimes forming irregular columns, occasionally may form thick plates; colony size usually <30 cm diameter; occasionally may reach 50 cm. Colony may be gray, brown, or green and usually lacks the green centers that are often diagnostic in other locations.

DISTRIBUTION: Widespread in the Indo-West Pacific from the Red Sea to New Caledonia and south to Rottnest Island, Western Australia. A common species, previously reported from Kuwait, eastern Saudi Arabia, and Oman.

TAXONOMIC NOTES: Downing (1989) reported two species of *Favites* from Kuwait: *F.* sp. aff. *abdita* Ellis & Solander and *F. pentagona*. All specimens we studied fall within the range of *F. pentagona*. Coralla from protected habitats in Kuwait have a smoother, more rounded (*F. abdita*-like) appearance than those from similar habitats in the western Pacific because of reduced development of dentations and spines.

Genus *Platygyra* Ehrenberg

Platygyra daedalea (Ellis & Solander, 1786)

TYPE LOCALITY: Fiji.

DESCRIPTION: Colonies incrusting to massive, often 1 m and sometimes up to 4 m diameter, forming large coral heads. Usually meandroid with long series; however, many colonies have areas with short collines, <2 cm. Colony color tan, brown, green, and gray-green.

DISTRIBUTION: Widespread in the Indo-West Pacific from the Red Sea to the Marshall Islands south to Houtman Abrolhos, Australia. Reported from the Arabian Gulf and Oman. Common on all reefs at all depths in Kuwait, with large colonies dominating shallow reef flats, especially at Qit' at Reef.

TAXONOMIC NOTES: Downing (1989) listed this species as *P. lamellina* Ellis & Solander. Although these two species are similar, the thin walls of the specimens we studied place it within *P. daedalea*.

Genus *Plesiastrea* Edwards & Haime

Plesiastrea versipora (Lamarck, 1816)

TYPE LOCALITY: Red Sea.

DESCRIPTION: Coralla incrusting to massive, smooth with low undulations, usually ca. 15 to 20 cm diameter, but may reach 50 cm. Color of colony usually bluish green or, in low-light conditions, dark brown.

DISTRIBUTION: Widespread in the Indo-Pacific from East Africa, the Red Sea, the Tuamotus, and Kyushu to southern Australia. Previously reported from Kuwait, eastern Saudi Arabia, and Oman. In Kuwait, present on all reefs from reef flat to reef base.

TAXONOMIC NOTES: The series of specimens from Kuwait is characterized by only slightly exsert corallites; coralla from the western Pacific often have corallites that are exsert several millimeters.

Genus *Leptastrea* Edwards & Haime

Leptastrea transversa Klunzinger, 1879

TYPE LOCALITY: Red Sea.

DESCRIPTION: Coralla closely incrusting to submassive, usually with an irregular surface perforated by holes left by parasitic barnacles. Colony size commonly 20 to 30 cm diameter, generally <50 cm. Colonies appear brown, coenosteum and walls white. Brown tentacles are often extended during the day. Colonies are frequently infested with iridescent blue barnacles; the barnacle openings are ca. 2 mm diameter.

DISTRIBUTION: Widely distributed in the Indo-Pacific from the Red Sea to Tahiti. Reported from Oman but not the Arabian Gulf. In Kuwait, present on most reefs but usually not abundant; evenly distributed throughout the depth range of reef-building corals.

TAXONOMIC NOTES: Burchard (1979) and Downing (1989) recorded *Leptastrea purpurea* Dana from the Arabian Gulf, and Burchard (1979) also recorded *L. bottae* (=*inaequalis* Klunzinger). Although *L. purpurea* is very similar to *L. transversa*, based on examinations of specimens from Kuwait and the illustrations of Burchard, all of these appear to fall within the range of *L. transversa*. This species is primarily differentiated from *L. purpurea* by its more open septal arrangement and its occasionally lamellar columella.

Genus *Cyphastrea* Edwards & Haime

Cyphastrea microphthalma (Lamarck, 1816)

TYPE LOCALITY: Indian Ocean.

DESCRIPTION: Colonies are incrusting or submassive, rarely massive, up to 40 cm diameter, with an irregular surface, often infested with barnacles and polychaete worms. Colony color most commonly brown or gray.

DISTRIBUTION: Widespread in the Indo-Pacific, the Red Sea to Tahiti, south to Lord Howe Island. Previously reported from Kuwait, eastern Saudi Arabia, and Oman. Common on all reefs of Kuwait; occurs at all depths on the reef but most common at shallow to intermediate depths.

Cyphastrea serailia (Forskål, 1775)

TYPE LOCALITY: Red Sea.

DESCRIPTION: Colonies incrusting, submassive to columnar, colony size to 50 cm, usually ca. 25 cm. Colonies various shades of brown.

DISTRIBUTION: Widespread in the Indo-West Pacific from the Red Sea to the Marshall Islands, south to the Solitary Islands. Reported from Kuwait, eastern Saudi Arabia, and Oman. In Kuwait, found on all

reefs and from most depths but more common at intermediate depths.

Family CARYOPHYLLIIDAE Gray

Genus *Heterocyathus* Edwards & Haime

Heterocyathus aequicostatus Edwards & Haime, 1848

TYPE LOCALITY: Unrecorded.

DESCRIPTION: Corals are solitary, free living, and superficially resemble another coral found in Kuwait, *Heteropsammia cochlea* Edwards & Haime (see below). *Heterocyathus aequicostatus* also has a commensal relationship with the same sipunculid worm (*Aspidosiphon corallicola* Moseley) that lives with *Heteropsammia cochlea*; the worm drags the corals across sandy substrate. The worm forms a circular hole 2.0 mm in diameter near one end of the flat base of the corallite. Smaller holes, ca. 0.3 mm diameter, are irregularly distributed on the flat base or sides of the corallum. The largest corallum in the specimens we studied has an oval base 14.0 by 16.0 mm and is 12.0 mm high, including the septa.

DISTRIBUTION: The Indian Ocean and the western Pacific, Australia, Indonesia. K.C. discovered specimens of this coral on soft substratum near pearl oyster beds, 1–4 km off the coast between Mina al Ahmadi and Ras J'Leya.

Family DENDROPHYLLIIDAE Gray

Genus *Turbinaria* Oken

Turbinaria peltata (Esper, 1794)

TYPE LOCALITY: China Sea.

DESCRIPTION: Colonies are flat plates ca. 10 mm thick and often <10 cm diameter, but occasionally reaching 30 cm, attached by a wide central stalk. Color gray-green to brown with white or yellow tentacles. Polyps sometimes partially extended during the day.

DISTRIBUTION: Widespread in the Indo-West Pacific, western Indian Ocean to the Marshall Islands, south to Lord Howe Island, Australia. Previously recorded from Kuwait, eastern Saudi Arabia, and Oman. Found from reef flat to reef base, but usually more common in deeper water at the base of the reef; never abundant.

TAXONOMIC NOTES: Although identical in skeletal details to specimens from the western Pacific, colonies in Kuwait never develop beyond the mushroom shape to form multiple layers or the vertical folia common in the western Pacific.

Turbinaria reniformis Bernard, 1896

TYPE LOCALITY: Palm Islands, Great Barrier Reef, Australia.

DESCRIPTION: Colonies are unifacial, foliaceous, sometimes vasiform, or form irregular thin plates, sometimes composed of several tiers or whorls. Colony size up to ca. 30 cm diameter. Plates 3.0 to 5.0 mm thick near edge, frequently folded, forming chimneys when they are subvertical. Colony color dark brown. Polyps white, sometimes partially extended during daytime.

DISTRIBUTION: Widespread in the Indo-Central Pacific, from the Red Sea to the Cook Islands, south to Recherche Archipelago (southwestern Australia). Not previously reported from the Arabian Gulf or Oman. Not common in Kuwait; a large patch is located between patch reefs at Mudayrah.

TAXONOMIC NOTES: Burchard (1979) reported *Turbinaria crater* from eastern Saudi Arabia, and Downing (1989) reported *T. frondens* (Dana) from Kuwait. Both of these appear to be misidentifications of *T. reniformis*, which has fewer septa and less exsert corallites than *T. frondens*. We concur with the assessment of Veron and Pichon (1980: 374) that the lack of the type specimen, inadequate description, and subsequent confusion in the literature make it difficult to correctly assign a coral to *T. crater*. For practical purposes we regard *T. crater* as a nomen dubium.

Genus *Heteropsammia* Edwards & Haime

Heteropsammia cochlea (Spengler, 1781)

TYPE LOCALITY: Bay of Bengal.

DESCRIPTION: Corals solitary, free living, with one corallite resting on a flattened base. According to Veron (1986): "They have an obligate commensal relationship with a sipunculid worm (*Aspidosiphon corallicola*) and usually have one parasitic mussel (*Lithophaga lessepsiana*) embedded above the sipunculid." The sipunculid drags the coral behind it as it moves across soft substrata. Corallite oval or laterally compressed, base irregularly oval. In the largest example in the specimens we studied, the base is 12.0 by 13.0 mm, and the corallite is 7.0 by 11.0 mm.

DISTRIBUTION: The Indian Ocean and western Pacific, north to Kyushu and south to Sydney. K.C. discovered specimens of this coral living on soft substratum, near pearl oyster beds, 1–4 km off the coast between Mina al Ahmadi and Ras J'Leya.

TAXONOMIC NOTES: Compared with specimens from the western Pacific, Kuwait specimens have poorly developed pali.

Genus *Dendrophyllia* de Blainville

Dendrophyllia gracilis Edwards & Haime, 1948

TYPE LOCALITY: China.

DESCRIPTION: Colonies dendroid and reptoid, usually ca. 6 cm diameter, composed of multiple twisted branches up to 23 mm in height (but usually < 15 mm), attached to each other by a thin basal plate; it appears that the various branches become separated at the base when the thin plate dies. Branches curved, with a tendency to increase in diameter with distance from base; largest branches oval, 7 mm by 8 mm in diameter. Small branchlets may bud from the basal plate or from the lower or upper reaches of the larger branches; new buds are circular up to ca. 2.2 mm diameter. Colony color brilliant translucent orange or yellow.

DISTRIBUTION: Widespread in the Indo-Pacific. Common on overhangs and in caves at most reefs. Not found at Qit' at.

TAXONOMIC NOTES: Kuwait specimens of this species are smaller, thinner, and show more curvature than *D. gracilis* from other locations. The common colors of *D. gracilis* outside Kuwait are orange-red or pink. The brilliant yellow has not been previously reported.

Genus *Tubastraea* Lesson

Tubastraea coccinea Lesson, 1829

TYPE LOCALITY: Bora Bora.

DESCRIPTION: Corallum dendroid, branching from relatively narrow base that is ca. 15.0 mm diameter. Branches up to 5.0 cm tall, round in cross section, each carrying several branchlets, the widest branch ca. 12.0 mm wide at its tip. Branches (corallites) are trumpet-shaped, one that is 11 mm high is 8.8 mm diameter at its proximal end and 11.0 mm at its distal end. The smallest new bud is 4.5 mm diameter. Color dark to bright red-orange. Calice up to 8.3 mm deep.

DISTRIBUTION: Widespread in the Indo-Pacific and Atlantic. In Kuwait, commonly inhabits underhangs and caves on most reefs.

Tubastraea tagusensis Wells, 1982

TYPE LOCALITY: Galápagos.

DESCRIPTION: Colonies reptoid to dendroid, characterized by many short branches extending out in all directions from a central origin, corallites oval, largest 7.0 by 13.0 mm, smallest 5.5 by 7.0 mm. Colonies may be deep red-brown to bright red-orange. Polyps not extended during the day.

DISTRIBUTION: Widespread in the Indo-Pacific. Found growing on underhangs and in caves at most reefs. Not found at Qit' at.

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